

Brugmansia

Brugmansia is a genus of seven species of flowering plants in the family Solanaceae. They are woody trees or shrubs, with pendulous flowers, and have no spines on their fruit. Their large, fragrant flowers give them their common name of **angel's trumpets**, a name sometimes used for the closely related genus *Datura*. (*Datura* differs from *Brugmansia* in that they are herbaceous bushes, with erect rather than pendulous flowers - and most have spines on their fruit).

Like many ornamental plants, all parts of *Brugmansia* can be toxic.^[2] All seven species are listed as Extinct in the Wild by the IUCN Red List, although they are popular ornamental plants and still exist wild in other areas as an introduced species.^[3]

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Description

Brugmansia are large shrubs or small trees, with semi-woody, often many-branched trunks. They can reach heights of 3–11 m (10–36 ft). The leaves are alternately arranged along the stems, generally large, 10–30 cm (4–12 in) long and 4–18 cm (2–7 in) across, with an entire or coarsely toothed margin, and are often covered with fine hairs. The name "angel's trumpet" refers to the large, pendulous, trumpet-shaped flowers, 14–50 cm (6–20 in) long and 10–35 cm (4–14 in) across at the opening. They come in shades of white, yellow, pink, orange, green, or red. Most have a strong, pleasing fragrance that is most noticeable in the evening. Flowers may be single, double, or more.

Distribution and habitat

Brugmansia



Brugmansia 'Feingold'

Scientific classification

Kingdom:	Plantae
<i>Clade</i> :	Angiosperms
<i>Clade</i> :	Eudicots
<i>Clade</i> :	Asterids
Order:	Solanales
Family:	Solanaceae
Subfamily:	Solanoideae
Tribe:	Datureae
Genus:	<i>Brugmansia</i> <div>Pers.</div>

Species

See text

Synonyms

Methysticodendron R.E.Schult.
Pseudodatura Zijp^[1]

Brugmansia are native to tropical regions of South America, along the Andes from Venezuela to northern Chile, and also in south-eastern Brazil.^[3] They are grown as ornamental container plants worldwide, and have become naturalized in isolated tropical areas around the globe, including within North America, Africa, Australia, and Asia.^{[4][5][6][7]}

Ecology

Most *Brugmansia* are fragrant in the evenings to attract pollinating moths.^[8] One species lacking scent, the red-flowered *Brugmansia sanguinea*, is pollinated by long-billed hummingbirds.^[3] *Brugmansia* have two main stages to their life cycle. In the initial vegetative stage the young seedling grows straight up on usually a single stalk, until it reaches its first main fork at 80–150 cm (2.6–4.9 ft) high. It will not flower until after it has reached this fork, and then only on new growth above the fork. Cuttings taken from the lower vegetative region must also grow to a similar height before flowering, but cuttings from the upper flowering region will often flower at a very low height.^[3]

One interesting example of plant/animal interaction involves the butterfly *Placidula euryanassa*, which uses *Brugmansia suaveolens* as one of its main larval foods. It has been shown that these can sequester the plant's tropane alkaloids and store them through the pupal stage on to the adult butterfly, where they are then used as a defense mechanism, making themselves less palatable to vertebrate predators.^[9]

Taxonomy



Brugmansia sanguinea

Linnaeus first classified these plants as part of *Datura* with his 1753 description of *Datura arborea*. Then in 1805, C. H. Persoon transferred them into a separate genus, *Brugmansia*, named for Dutch naturalist Sebald Justinus Brugmans.^[3] For another 168 years, various authors placed them back and forth between the genera of *Brugmansia* and *Datura*, until in 1973, with his detailed comparison of morphological differences, T.E. Lockwood settled them as separate genera, where they have stayed unchallenged since.^[10]

Currently, there are 7 recognized species:^[11]

- *Brugmansia arborea* (L.) Sweet (Andes - Ecuador to northern Chile)
- *Brugmansia aurea* Lagerh. (Andes - Venezuela to Ecuador)
- *Brugmansia insignis* (Barb.Rodr.) Lockwood ex R.E. R.E.Schult. (Eastern Andes foothills - Colombia to Bolivia and occasionally Brazil)
- *Brugmansia sanguinea* (Ruiz & Pav.) D.Don (Andes - Colombia to northern Chile)
- *Brugmansia suaveolens* (Willd.) Sweet (Southeast Brazil)
- *Brugmansia versicolor* Lagerh. (Ecuador)
- *Brugmansia vulcanicola* (A.S.Barclay) R.E.Schult. (Andes - Colombia to Ecuador)

These species are then divided into two natural, genetically isolated groups.^[12] *Brugmansia* section *Brugmansia* (the warm-growing group) includes the species *aurea*, *insignis*, *saueolens*, and *versicolor*. *Brugmansia* section *Sphaerocarpium* (the cold group) includes the species *arborea*, *sanguinea*, and *vulcanicola*.^[11]

Two of these species were challenged by Lockwood in his 1973 doctoral thesis.^[13] First, *Brugmansia vulcanicola* was said to be a subspecies of *B. sanguinea*, but this was refuted by Lockwood's former mentor, R. E. Schultes in 1977.^[14] Second, Lockwood proposed that the species *B. insignis* was instead a hybrid of the combination (*B. suaveolens* x *B. versicolor*) x *B. suaveolens*. This was later disproved by crossbreeding experiments done by the Preissels, published in 1997.^[3]

Uses

Brugmansia are most often grown today as flowering ornamental plants.

In modern medicine, important alkaloids such as scopolamine, hyoscyamine, and atropine, found in *Brugmansia* and other related members of Solanaceae, have proven medical value for their spasmolytic, anti-asthmatic, anticholinergic, narcotic and anesthetic properties, although many of these alkaloids, or their equivalents, are now artificially synthesized.^[15]

Brugmansia have also traditionally been used in many South American indigenous cultures in medical preparations and as an entheogen in religious or spiritual ceremonies.^[16] Medicinally, they have mostly been used externally as part of a poultice, tincture, ointment, or where the leaves are directly applied transdermally to the skin. Traditional external uses have included the treating of aches and pains, dermatitis, orchitis, arthritis, rheumatism, headaches, infections, and as an anti-inflammatory. They have been used internally much more rarely due to the inherent dangers of ingestion. Internal uses, in highly diluted preparations, and often as a portion of a larger mix, have included treatments for stomach and muscle ailments, as a decongestant, to induce vomiting, to expel worms and parasites, and as a sedative.^{[17][18][19][20]}

Several South American cultures have used *Brugmansia* as a treatment for unruly children, that they might be admonished directly by their ancestors in the spirit world, and thereby become more compliant. Mixed with maize beer and tobacco leaves, it has been used to drug wives and slaves before they were buried alive with their dead lord.^{[17][21][22]}

Toxicity

All parts of *Brugmansia* are potentially poisonous, with the seeds and leaves being especially dangerous.^{[19][23]} *Brugmansia* are rich in scopolamine (hyoscyine), hyoscyamine, and several other tropane alkaloids.^[24] Effects of ingestion can include paralysis of smooth muscles, confusion, tachycardia, dry mouth, diarrhea, migraine headaches, visual and auditory hallucinations, mydriasis, rapid onset cycloplegia, and death.^{[25][26][27]}

The hallucinogenic effects of *Brugmansia* were described in the journal *Pathology* as "terrifying rather than pleasurable".^[28] The author Christina Pratt, in *An Encyclopedia of Shamanism*, says that "*Brugmansia* induces a powerful trance with violent and unpleasant effects, sickening after effects, and at times temporary insanity".^[19] These hallucinations are often characterized by complete loss of awareness that one is hallucinating, disconnection from reality, and amnesia of the episode, such as one example reported in *Psychiatry and Clinical Neuroscience* of a young man who amputated his own penis and tongue after drinking only 1 cup of *Brugmansia* tea.^[29] The Swiss naturalist and explorer Johann von Tschudi described the effects of *Brugmansia* ingestion on one individual in Peru:

Soon after drinking the Tonga, the man fell into a dull brooding, he stared vacantly at the ground, his mouth was closed firmly, almost convulsively and his nostrils were flared. Cold sweat covered his forehead. He was deathly pale. The jugular veins on his throat were swollen as large as a finger and he was wheezing as his chest rose and sank slowly. His arms hung down stiffly by his body. Then his eyes misted over and filled with huge tears and his lips twitched convulsively for a brief moment. His carotids were visibly beating, his respiration increased and his extremities twitched and shuddered of their own accord. This condition would have lasted about a quarter of an hour, then all these actions increased in



Urarina shaman, 1988. The Urarina use *Brugmansia* in their rituals.

intensity. His eyes were now dry but had become bright red and rolled about wildly in their sockets and all his facial muscles were horribly distorted. A thick white foam leaked out between his half open lips. The pulses on his forehead and throat were beating too fast to be counted. His breathing was short, extraordinarily fast and did not seem to lift the chest, which was visibly fibrillating. A mass of sticky sweat covered his whole body which continued to be shaken by the most dreadful convulsions. His limbs were hideously contorted. He alternated between murmuring quietly and incomprehensibly and uttering loud, heart-rending shrieks, howling dully and moaning and groaning.^[3]

In 1994 in Florida, 112 people were admitted to hospitals from ingesting *Brugmansia*,^[30] leading one municipality to prohibit the purchase, sale, or cultivation of *Brugmansia* plants.^{[3][31][32]} The concentrations of alkaloids in all parts of the plant differ markedly. They even vary with the seasons and the level of hydration, so it is nearly impossible to determine a safe level of alkaloid exposure.^[25]

Cultivation

Brugmansia are easily grown in a moist, fertile, well-drained soil, in sun to part shade, in frost-free climates. They begin to flower in mid to late spring in warm climates and continue into the fall, often continuing as late as early winter in warm conditions. In cool winters, outdoor plants need protection from frost, but the roots are hardier, and may resprout in late spring. The species from the higher elevations, in *B.* section *Sphaerocarpium*, prefer moderate temperatures and cool nights, and may not flower if temperatures are very hot. Most *Brugmansia* may be propagated easily by rooting 10–20 cm (4–8 in) cuttings taken from the end of a branch during the summer.

Several hybrids and numerous cultivars have been developed for use as ornamental plants. *B.* × *candida* is a hybrid between *B. aurea* and *B. versicolor*; *B.* × *flava* is a hybrid between *B. arborea* and *B. sanguinea*; and *B.* × *cubensis*^[12] is a hybrid between *B. suaveolens*, *B. versicolor*, and *B. aurea*. There are cultivars producing double flowers, and some with variegated leaves. The cultivar *B.* × *candida* 'Grand Marnier' has gained the Royal Horticultural Society's Award of Garden Merit.^[33]



Angel trumpets shrub --
Brugmansia suaveolens



Brugmansia
flower



hybrid *Brugmansia suaveolens*



Angel trumpets --
Brugmansia suaveolens



Brugmansia × *candida*,
Mangonui, North Island,
New Zealand



Brugmansia vulcanicola
flower



Brugmansia suaveolens
flower



Mounts Botanical
Garden, West Palm
Beach, Florida



Brugmansia × *candida*,
Berkeley, California,
USA

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Further reading

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- Gottschalk, Monika (2000). *Engelstropeten* (German with English translation booklet). BLV Verlagsgesellschaft mbH. ISBN 978-3-405-15760-9
- Geit, Lars and Birgitta. *Änglatrumpeter och spikklubb* Norwegian text but photo rich. Small coffee-table book. ISBN 978-91-534-2511-3

External links

- ICRA plant registration for Brugmansia cultivar names (<http://www.brugmansia.us>)
- Brugmansia discussion hobbyist group (<http://www.brugmansia.us>)
- Detailed cultural information (<https://web.archive.org/web/20111226190913/http://www.logees.com/ftg/Brugmansia.pdf>)
- Langenbuscher Garten in Remscheid, Germany (<http://www.engelstropeten.de>)
- *Brugmansia* Vault (<http://www.erowid.org/plants/brugmansia/brugmansia.shtml>) – Erowid

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